Space Weather Forecast

Issued on Sunday, 20 August 2023 at 01:11 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Slightly increasing Chance of Minor R1 Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has remained low, with the peak flare of the UTC day of Saturday 19 August a mid-ranking Common-class event from a small but dynamic sunspot in the far southwest at 19/0648UTC. Background X-ray flux otherwise remains subdued.

There are currently up to nine sunspot regions on the facing side of the Sun, with a new arrival near the southeastern solar horizon. The main changes in the period were tied to intermediate and trailing spot development in two of the larger and more complex regions, while the peak flare-producing sunspot in the southwest showed changeable spots come and go. Other groups on the facing side were generally magnetically simpler and more stable or else fading.

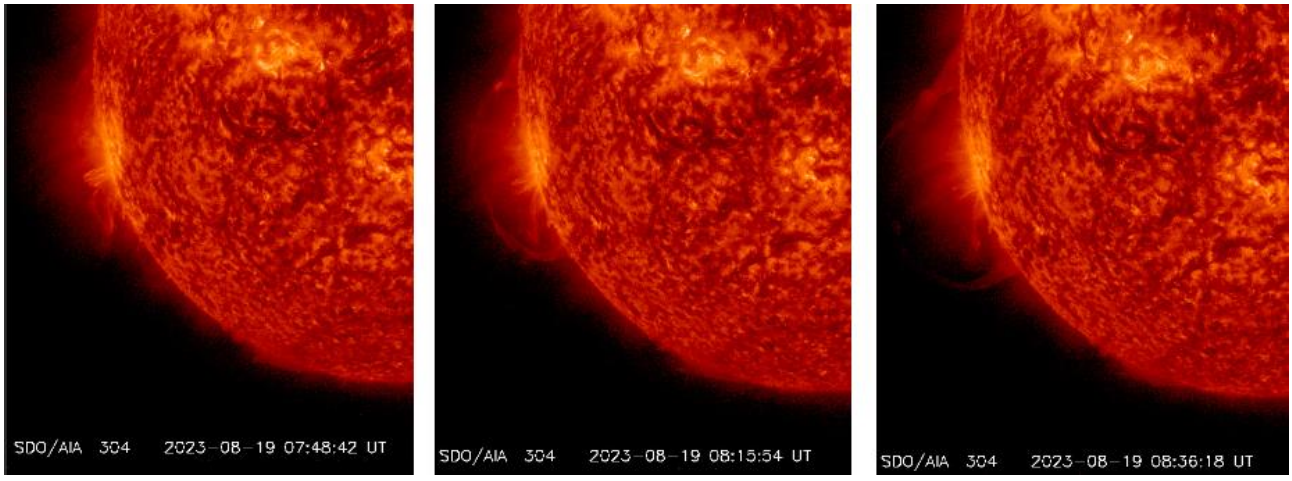

Figure 1: False-colour extreme UV time sequence showing a large, narrowly far-sided prominence lift-off between 19/0730 and 0900UTC. This CME has been analysed and has no effect on Earth.

There were a few progenitors of Coronal Mass Ejections (CMEs) visible in the past 24 hours. The first of these was a very large roughly 20-degree solar latitude-spanning 'prominence eruption' (arc of plasma) from just behind eastern solar horizon, taking place between 19/0730 and 0900UTC. This produced a clear CME that has been determined to have no Earth-directed component. This was followed a little later in the day by an eastern solar horizon CME near solar the northern end of the previous prominence - around the solar equator at 19/1500UTC. This has yet to be analysed but is not expected to affect Earth. Both of these events could perhaps be suggestions that a large and previously active sunspot region may have survived in some form at this location - something of relevance for the X-ray forecast - and eventually the geomagnetic and solar radiation forecast

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

should it survive for any length of time.

The final main noted event was a 'filament eruption' from the vicinity of a sunspot in the northwest at 19/1800UTC. Imagery for this is pending, however - tentatively - no Earth-directed CMEs feature in the forecast.

Solar Wind / Geomagnetic Activity: The solar wind suggests Earth is transiting a sector of space characterised by an easing then resurgent fast wind regime.

Solar wind speeds initially declined from elevated levels to reach a midday nadir of slightly elevated, before increasing in the UTC afternoon and evening to recover almost all their lost ground. The number of particles in the solar wind showed a similar undulating pattern - from slightly elevated levels to background and back again - before a more decided fall at the very end of the 24 hours. The associated magnetic field showed a change in character from a flat trend until the UTC afternoon, whereupon a steady rise to slightly elevated levels commenced, again moderating slightly at the close of the day. The north-south component again did not spend protracted periods either co- or anti-aligned with Earth's field.

The net result of the above solar wind measures was for provisionally mainly quiet geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is most likely to remain low, but perhaps show an uptick with the arrival of a far-sided groups (that was highly active as they left the Earth-facing side) into the new UTC week.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs feature in the forecast, and the sole fast wind is the incumbent one that is again now waning. An increasingly quiet forecast is again expected into the new UTC working week.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	25	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	2	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.